WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005AZ89B

Title: Big Chino Basin 3-D Digital Hydrogeologic Framework Model

Project Type: Research

Focus Categories: Models, Groundwater

Keywords: Hydrogeology, Model Studies, 3D Visualization

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: $9,000

Non-Federal Matching Funds: $25,069

Congressional District: 1

Principal Investigator:
Abe Springer

Abstract

The Verde River is one of the largest remaining free-flowing, perennial rivers in the Southwestern U.S. The headwaters of the Verde River are a series of springs fed by groundwater from large regional aquifer(s) which are the primary source of water for the first 29 miles of the upper perennial reach of the Verde River. These 29 miles of river support approximately 800 riparian acres with an average discharge of approximately 25 ft3/sec. Although the location and discharge of the springs which form the Verde Headwaters is known, it is uncertain what the source areas of these springs are. The headwaters occur at the intersection of some very complicated geologic terrain at the intersection of the Little Chino Basin, Big Chino Basin, Lower Granite Creek area, and bedrock of Big Black Mesa.

The subsurface geology of Big Chino Basin is not widely understood. A complex combination of Tertiary sediments and basalt flows exist, along with faulting of Paleozoic carbonate rocks along the northeastern boundary of the valley. Understanding and quantifying groundwater flow in the Big Chino Basin aquifer first requires a complete understanding of the geology of this region.

A Digital Hydrogeologic Framework Model (DHFM) will be constructed using EarthVision, a three-dimensional (3-D) geographic information system (GIS) software. The DHFM will be displayed with a 3-D viewer. Well logs contained in the ADWR well database will be interpreted for lithology, and accurately located using a global positioning system (GPS). These will serve as the basis for the DHFM.

The DHFM will serve as a tool for understanding and conveying the complex subsurface geology of the region to water managers and others who can directly benefit from this knowledge. It will also be used by the USGS Water Division in Tucson to construct a Groundwater Flow Model of the region, which will further serve as a management tool.